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Pest birds—an international perspective

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Introduction

Birds have affected man, both positively and negatively, for thousands of years. When birds conflict with man's endeavours, they become a pest problem that can cause serious economic losses or threaten human health and safety. The most serious economic losses are caused by birds feeding on agricultural crops. Birds also can damage stored grains; consume high-protein commercial feed at livestock feedlots and mink and poultry farms; damage plastic irrigation pipes, cables, wooden utility poles, and houses; damage trees, structures, and equipment; cause a potential health hazard by forming large roosting concentrations at urban and rural areas; and cause hazards to aircraft.

Bird damage to both sprouting and ripening grains occurs worldwide. Most pest species are in the order Passeriformes. Where economies are largely based on agriculture, particularly in developing countries, losses caused by birds can result in inadequate food supplies for millions of people in scores of nations. Countries with highly developed agricultural technology spend considerable time and effort in attempting to improve methods for prevention of bird damage. In developing countries, however, resources are limited and insufficient scientific or technological effort has been devoted to resolving pest bird problems. Under these conditions, pest birds can severely limit agricultural production on a local scale, particularly in areas where farmers are dependent for sustenance and income on the harvest from their small fields.

The crop and geographic region determine the species that are implicated in damage situations. Most pest species are wide-ranging and many are migratory. Many species have learned to take advantage of man's agricultural activities and feed upon newly introduced crops within their range. In some cases, these crops replace wild foods present before the land was cultivated, although more often they are an important supplement taken

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when native foods are scarce. A variety of crops are eaten or damaged by birds including cereal grains, oil crops, fruit and nut crops, and vegetables.

Damage to cereal crops (source: De Grazio 1978, unless otherwise indicated)

Africa

The pest status of the Red-billed Quelea is fully discussed in the next chapter. It suffices here to state that both in global terms and of course in Africa, the available evidence strongly suggests that the quelea is the most serious of all agricultural pests.

Apart from the quelea, other examples of bird pest problems in Africa are rice damage by House Sparrows *Passer domesticus* in Egypt, damage to grain sorghum by Laughing Doves *Streptopelia senegalensis* and Cape Turtle Doves *S. capicola* in Botswana, loss of rice to the Red Fody *Foudia madagascariensis* in Madagascar (Fahlund 1965), loss of wheat to House and Spanish Sparrows *Passer hispaniolensis* in Morocco, an instance of US \$2.8 million lost in ripening cereal in one Province in Nigeria (Fahlund 1965), and loss of 100 000 to 200 000 t of cereal to birds in Senegal (Mallamaire 1959a). Black-headed Weavers *Ploceus cucullatus* were reported as a serious pest in millet in Chad and sparrows in wheat and barley in Libya (Jackson and Jackson 1977). In Somalia, quelea, bishops, and *Ploceus* weavers damage rice and grain sorghum, and *Ploceus* weavers damage maize (Bruggers 1980).

Tree-ducks *Dendrocygna* spp., Ruffs *Philomachus pugnax*, and Sparrow Larks *Eremopterix* spp. damage newly sown and emerging rice and wheat in Cameroon, Senegal, and Sudan (Bruggers 1979a; Hamza *et al.* 1982; J. De Grazio *et al.*, unpubl. data). In the Senegal River Valley, Senegal, a 9000 ha Government rice scheme experienced losses by wading species of >15 per cent in 1975; Treca (1976) confirmed the occurrence of considerable localized aquatic bird damage to newly sown seeds in this valley.

Other species that can cause economic losses to African agriculture are Golden Sparrows *Passer luteus*, starlings *Lamprotornis* spp., doves *Streptopelia* spp., Bimaculated Larks *Melanocorypha bimaculata*, Crowned Cranes *Balearica pavonina*, European Starlings *Sturnus vulgaris*, White-vented Bulbuls *Pycnonotus barbatus*, and Rose-ringed Parakeets *Psittacula krameri*.

Asia and the Middle East

Rice is the grain most often damaged in Asian and Middle Eastern countries. The main pest species throughout most of Asia are mannikins and munias *Lonchura* spp., sparrows, larks, weavers, mynahs *Acridotheres* spp., crows, bulbuls (Pycnonotidae), finches (Fringillidae), and parrots (Psittacidae). In

Borneo, the Pin-tailed Parrot-finches *Erythrura prasina* is a serious rice pest (Grist and Lever 1969). Up to 50 per cent loss of rice has been caused by weavers in Thailand. Other important cereal damage caused by a variety of species occurs in rice, grain sorghum, and millet in India (Prakash 1982; Shivanarayan 1980), barley, millet, and emerging cereal grains in Korea (Howard *et al.* 1975), and wheat and corn in Nepal. The White-rumped Munia *Lonchura striata* damages rice in Malaysia (Avery 1979). Emerging grains are damaged by House Sparrows, mynahs, crows, and doves in Bangladesh (Poché *et al.* 1980). In Pakistan, sparrows, parakeets, doves, crows, and weavers have been reported to cause an estimated annual loss of \$31 million to ripening cereals (Roberts 1981), and Bashir (1978) reported that Rose-ringed Parakeets regularly destroy in excess of 50 per cent of the maize crop. In the Near East, House and Tree Sparrows cause major problems in wheat in Turkey. In Israel, three species of larks (Alaudidae) cause problems in wheat and barley. Despite this extensive list of damage situations, losses in Asia are probably considerably less than those in Latin America and Africa.

Oceania

Rice and wheat are the cereals most frequently damaged by House Sparrows in New Zealand (Dawson 1970), and by parrots, crows, and waterfowl in Australia (Grist and Lever 1969). In New Guinea, the Spotted Tree-duck *Dendrocygna guttata*, Whistling Tree-duck *D. arcuata*, Spotbill Duck *Anas superciliosa*, and Pied Goose *Anseranas semipalmata* damage emerging and ripening rice (Grist and Lever 1969). The Galah *Eolophus roseicapillus* is also an agricultural pest in Oceania.

Latin America

Grain sorghum, corn, rice, and wheat are the cereals most frequently damaged. Examples include up to 80 per cent loss of rice in Argentina to the Brown Pintail *Anas georgica* and Chestnut-capped Blackbird *Agelaius ruficapillus*; \$7.0 million loss to rice by Black-headed Weavers in 1971 in the Dominican Republic (Peña 1977); and \$0.25 million loss to emerging wheat primarily by Eared Doves *Zenaida auriculata* in 1974 in Uruguay (J. De Grazio and J. Besser, unpubl. data). Two widespread pest bird problems in Latin America are damage by White-faced Tree-ducks *D. viduata* to emerging rice (it occurs in Argentina, Colombia, Costa Rica, Honduras, Nicaragua, Surinam, Uruguay, and Venezuela) and parrot damage to corn and grain sorghum. The Dickcissel *Spiza americana* is an important but sporadic pest of rice in Colombia and Mexico (Elias 1977) and to rice and grain sorghum in Costa Rica, Trinidad, and Venezuela (De Grazio and Besser

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1970). Other agricultural pest birds in Latin America include the White-winged Dove *Zenaida asiatica*, Monk Parakeet *Myiopsitta monachus*, parakeets of the genus *Aratinga*, Great-tailed Grackle *Cassidix mexicanus*, and cowbirds *Molothrus* spp. In the Caribbean, the Hispaniolan Woodpecker *Melanerpes striatus* and the Black-headed Weaver are the key pests.

Europe

In Great Britain, the classic bird pests of cereals are the Wood Pigeon *Columba palumbus* (Murton 1965), the Rook *Corvus frugilegus* (Dunnet and Patterson 1968), and the European Starling *Sturnus vulgaris* (Feare 1984). The Wood Pigeon also causes serious problems to cereals, especially wheat, in The Netherlands. In France, the Rook and the Carrion Crow *C. corone* are important pests to cereals. House Sparrows and Tree Sparrows are a problem in Germany, The Netherlands, and other parts of Europe. The Mallard *Anas platyrhynchos* damages rice in Bulgaria. In Poland, the Rook and the Common Jackdaw *C. monedula* are serious pests to both spring-planted and ripening cereals; House Sparrows damage ripening wheat and barley; and Rock Doves *Columba livia* damage newly planted wheat and maize (Pinowski 1973). Newton (1968) has summarized the importance of Bullfinches *Pyrrhula pyrrhula* as pests to fruit buds in Europe. Other potential European pest species include geese (Anserinae).

Canada

Losses to agricultural crops, primarily wheat, were estimated to amount to \$86 million to seed-eating birds in 10 provinces and \$33 million to waterfowl in 4 provinces. Losses were greatest in Ontario (\$40 million), Quebec (\$24 million), and Manitoba (\$21 million) (Alsager 1976). The Red-winged Blackbird *Agelaius phoeniceus*, Canada Goose *Branta canadensis*, and several species of surface-feeding ducks (Anatinae) were the most serious pests.

United States

Red-winged Blackbirds, Common Grackles *Quiscalus quiscula*, and European Starlings are the most serious agricultural pest birds in the United States. Surveys of blackbird damage to ripening corn in 1970, 1971, and 1981 showed nation-wide losses of \$15, \$20, and \$35 million, respectively. Damage to emerging corn by Common Grackles and the introduced Ring-necked Pheasants *Phasianus colchicus* may be equally important; losses in 1971 may have ranged from \$6 to \$49 million (Stone and Mott 1973a). J. Besser (unpubl. data) evaluated current bird damage estimates in the United States to ripening and sprouting cereals at about \$66 million; corn was most often

damaged, with losses amounting to about \$48 million. Regional examples of bird damage to cereal grains in the United States include blackbird damage to rice in 22 counties in Arkansas in 1963 (\$4.2 million; Meanley 1971) and blackbird and sparrow damage to grain sorghum in 23 states in 1974 (\$5.8 million; Knittle and Guarino 1976).

Damage to some non-cereal crops

Important examples of bird damage to non-cereal crops worldwide include damage to oilseeds, particularly sunflowers. In India, sunflower field damage may reach 100 per cent in unprotected fields (Shivanarayan 1980). In Pakistan, parakeets may even prevent farmers from growing promising oilseed crops or cause them to abort their production attempts after only a single trial (Anon. undated; Roberts 1974). Agriculturalists in Pakistan are trying to close the gap between oilseed production and consumption (Muhammed and Khan 1982), which is currently costing the country \$239 million, but finding methods of reducing bird damage will be imperative to their success (J. Besser, unpubl. data). In Latin America, parrot damage to sunflowers occurs in Argentina, Bolivia, Brazil, Paraguay, and Uruguay. It is most acute in Uruguay where, in 1974, \$600 000 was lost to the Monk Parakeet. Damage to sunflowers is also caused by Tree Sparrows in Korea, House and Tree Sparrows in Morocco (De Grazio 1978), and House Sparrows in Poland (Pinowski 1973). J. Besser (unpubl. data) estimated the annual sunflower loss in the United States to blackbirds at \$7 million.

In Latin America, Eared Doves are a major pest to emerging soybeans in Argentina, Colombia, and Uruguay; White-winged Doves damage the same crop in Honduras, Mexico, and Nicaragua. The Rufous Turtle Dove *Streptopelia orientalis* hampers soybean cultivation in Japan by feeding on newly planted seeds and emerging cotyledons (Nakamura and Matsuoka 1983).

Bird damage to fruit is primarily a problem in the United States, Canada, and Europe. In the United States, bird damage to fruit amounts to about \$19 million annually, with cherries (\$11 million) being the fruit crop most often damaged (J. Besser, unpubl. data). Bird damage to cherries is also a problem in Ontario, Canada. In Europe, the Bullfinch is a serious problem to the fruit industry. The European Starling is another major pest of fruit in various parts of Europe.

Many species of birds also attack fruit crops in developing countries. In Latin America, Monk Parakeets damage a variety of fruit in Argentina, Bolivia, Brazil, Paraguay, and Uruguay. The Brown Jay *Cyanocorax morio* is implicated in Costa Rica. Parrots attack mangoes in Honduras and Mexico. In North-east Africa, the European Starling and a thrush damage olives, and

the White-vented Bulbul is a problem on other fruit. In South Africa, the European Starling, Red-winged Starling *Onychognathus morio*, and Cape Sparrow *Passer melanurus* cause problems. In Tunisia, the European Starling damages olives to the extent of 15 000 t loss in yield per year (De Grazio 1978). In Pakistan, bulbuls and parakeets are the chief pests; Red-vented Bulbuls *Pycnonotus cafer* are problems on pears, plums, and persimmons, and the Black Bulbul *Hypsipetes madagascariensis* on apricots and peaches in Northwest Frontier Districts (Anon. undated); parakeets caused problems on a variety of fruit in these districts (J. Besser, unpubl. data), including apples and pears (Ali and Ripley 1969). Losses to fruit are caused by parrots, finches, and crows in Bangladesh, and by crows in Korea.

Similarities and differences

It is clear that bird pest species are present in almost every habitat on every continent and that the damage involves many of the same crops and genera of birds. Species causing damage may comprise a flock of only a few individuals such as bulbuls feeding on ripening mangoes in an Ethiopian village, or swarms of thousands such as quelea devastating ripening grain sorghum in Botswana. Damage to crops at particular plant growth stages is quite similar regardless of locality, and species causing problems exhibit many similar destructive habits. Because more similarities than dissimilarities exist, bird damage research conducted in one part of the world sometimes has much value to farmers in another area. For instance, if an effective method were found to prevent parakeets from damaging corn in Pakistan, it might need only slight modifications to prevent blackbirds from damaging corn in the United States. If an effective method were found for dealing with dickcissel damage to rice in Nicaragua, it would have value as a basis for dealing with blackbird depredations in rice in the United States and quelea damage to cereals in Africa (De Grazio and Besser 1970). Likewise, in northern, temperate regions, planting of grains is largely restricted to the months of April and May, and ripening grains are vulnerable to birds mostly in the months of August and September. These seasons give researchers only short periods each year to carry out field tests of damage control procedures. In tropical regions, many of the same crops ripen almost every month of the year. Whereas research in the United States now takes 5 years and usually longer to work out an effective procedure to control a specific kind of damage, the availability of similar problems in tropical and southern regions could substantially shorten the time needed for a solution.

Developing a management strategy

No single method of reducing losses to birds is applicable to all damage situations. Numerous vertebrate pest management materials, methods, and techniques have been used or suggested for particular situations. These include frightening devices, traps, protective netting, nest destruction, electric shock, shooting, cultivation of less susceptible crop varieties, modified planting and harvest schedules, alternative crops or foods, decoy crops, varying seeding depths, habitat alteration, lethal baits, lethal sprays, contact toxicants, repellent sprays, stressing agents, glues, soporifics, chemosterilants, hunting, predators, diseases, and parasites (Boudreau 1975). Methods must not only be effective in reducing damage, but also should be evaluated for safety to humans and non-target animals, cost, practicality, environmental effects, acceptability to farmers, and availability of materials. Unfortunately, even the effectiveness of most potential crop protection methods has not been adequately evaluated in many situations, and even under ideal conditions, effectiveness varies.

Managing pest birds is a very challenging endeavour. Successfully developing an effective vertebrate pest control technology involves problem identification, species identification and biology, materials research and laboratory and field evaluation, and training and technology transfer. Before undertaking crop protection experiments, it is important to confirm that the damage is actually being caused by birds. Birds frequently are blamed for lower yields that may have been attributable, wholly or in part, to plant diseases, insects, nocturnal mammals, or poor management. In some cases, birds may actually have been feeding on insects in the field. It also is important to identify correctly the pest species, because species vary in their susceptibility to different control methods.

To gauge the amount of research a pest bird situation warrants, it is necessary to obtain a general estimate of the amount of loss being sustained per unit area (a group of farms, a village, a province). Loss information both on a national and local scale entails the greatest coordinated effort. Because increased yield and subsequently the cost:benefit ratio is the basis for determining the value of control methods, loss data influence the type and intensity of control efforts and are the measure of success or failure.

Damage control for vertebrates such as birds is perhaps even more complex than that for invertebrates. Although most agricultural organizations are staffed with entomologists, few have personnel trained in animal ecology or wildlife management with experience in managing vertebrate pests. Because of their association with pests and pesticides, staff entomologists often inherit problems of vertebrate pest management. However, a wildlife biologist with experience in managing vertebrate pest situations is no

more qualified to provide professional leadership in entomology than the entomologist is in the management of vertebrate populations (Besser 1971).

Differences among countries in economics and cultures also contribute to the challenge of managing pest birds. A device or technique applicable in a developed country may not be applicable under conditions prevailing in a developing country. For example, expensive devices that produce bird distress calls may provide economic protection to a high-value crop such as lettuce in California, but would be impractical for farmers in Sudan who are trying to protect sorghum fields and whose earnings amount to only a few hundred dollars annually. In many developing countries, some cultures strongly oppose any manner of killing even though birds may be causing real hardship to the family, village, or community. Present-day research in bird damage is becoming more sophisticated, and long-range benefits and safeguards are now being considered at the planning stage.

It is imperative that research findings in one part of the world should be shared with individuals and agencies confronted with similar damage situations elsewhere. Efforts should be made to optimize resources and expertise through co-operative planning and complementary research. Since vertebrate pests play a major role in limiting agricultural production and often have the greatest impact on the poorest farmers in marginal production areas, training of counterpart personnel and extension of research recommendations should be an integral part of a developing country's vertebrate pest programme. Transferring information can take many forms and will include exchange of letters between interested parties, workshops, demonstrations, seminars, training manuals, brochures, preliminary reports, formal publications, and media materials (De Grazio 1984).

Techniques to manage pest birds must be simple, safe, available, cost-effective, and adaptive to local farming practices; products and devices must be locally available, and farmers must be trained in their proper use. In addition, the correct use of recommended techniques should be reinforced by extensionists to ensure that practical and useful methods are maintained and do not fall into disrepute.

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